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Improved analysis of GW190412 with a precessing numerical relativity surrogate waveform model[1] SCOTT FIELD, TOUSIF ISLAM, University of Massachusetts Dartmouth, CARL-JOHAN HASTER, MIT, RORY SMITH, Monash University — The recent observation of GW190412, the first high-mass ratio binary black-hole (BBH) merger, by the LIGO-Virgo Collaboration (LVC) provides a unique opportunity to probe the impact of subdominant harmonics and precession effects encoded in a gravitational wave signal. We present refined estimates of source parameters for GW190412 using NRSur7dq4, a recently developed numerical relativity waveform surrogate model that includes all spin-weighted spherical harmonic modes less than 4 as well as the full physical effects of precession. We compare our results with two different variants of phenomenological precessing BBH waveform models, IMRPhenomPv3HM and IMRPhenomXPHM, as well as to the LVC results. Our results are broadly in agreement with IMRPhenomXPHM results and the reported LVC analysis compiled with the SEOBNRv4PHM waveform model, but in tension with IMRPhenomPv3HM. In this talk, I will summarize our refined parameter estimates and the disagreements between models. We also quantify the impact of various modeling assumptions, such the omission of subdominant modes and asymmetric modes (excited during precession), on the interpretation of GW190412. Ongoing parameter estimation efforts with numerical relativity surrogate models will also be summarized.

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